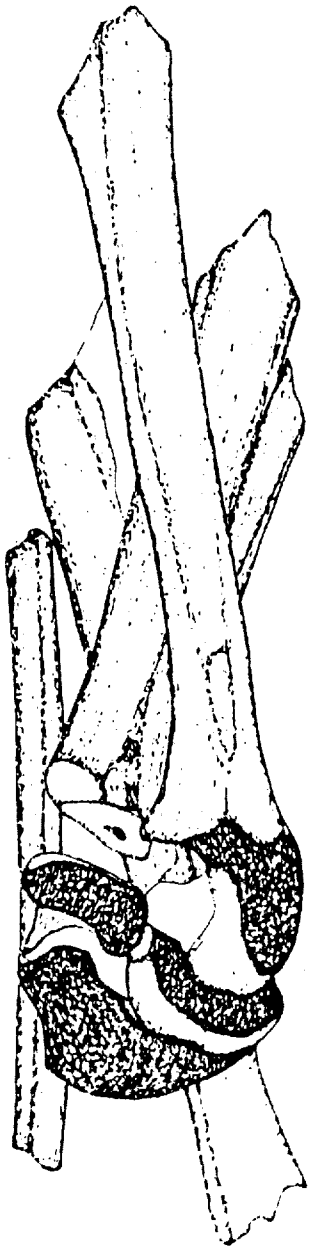
HUMAN SKELETAL MATERIAL FROM 23JA277 BLUE SPRINGS LAKE PROJECT JACKSON COUNTY, MISSOURI



By:

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Prepared For:

United States Army
Corps of Engineers
Kansas City District

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1988

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Prepared Under Contract DACW41-82-M-1218

(2)

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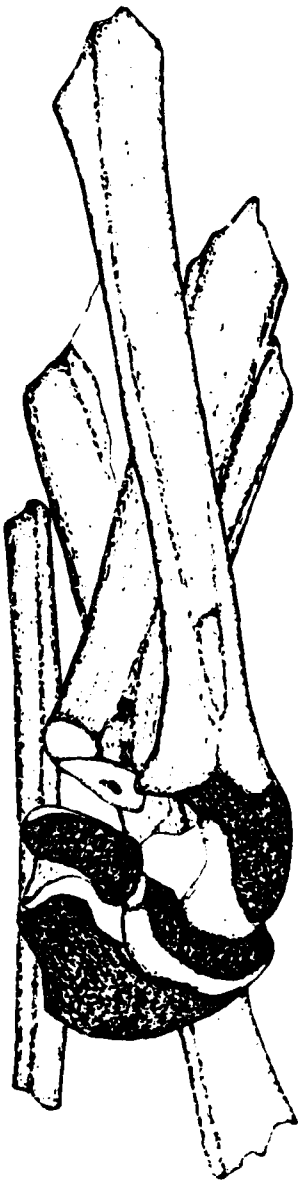

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Human skeletal remains recovered during the construction of the Blue Springs Lake Project were analyzed for sex, race, injury, and age determinations. Two females and a male, were studied. Radiocarbon dating of the materials placed the burials at approximately 3500 B.C. in the Middle to Late Archaic period.		

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Funds for this investigation and report were provided by the U.S. Army Corps of Engineers. The Corps may not necessarily agree with the contents of this report in its entirety. The report reflects the professional views of the contractor who is responsible for collection of the data, analysis, conclusions and recommendations.

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Introduction

The human skeletal material recovered from site 23JA277, located along the future Blue Springs Lake near Kansas City, Missouri, was analyzed by Larson-Tibesar Associates as part of an agreement (Contract No. DACW41-82-M-1218, Modification No. P00003) between that company and the United States Army Corps of Engineers, Kansas City District. The skeletal material was exposed along a vertical cut in a river diversion channel approximately 100 meters south of the East Fork, Little Blue River at a depth of approximately four meters below present-day ground surface. The osteological material was removed by personnel from the Jackson County Sheriff's Office. Apparently no cultural materials were found in association with the human skeletal remains.

Contract DACW41-82-M-1218 (Modification No. P00003) called for the scientific analysis of human skeletal remains to include the following:

> age, sex, minimum number present, pathological/stressful conditions, nonmetric traits, and measurement data including pertinent indices and cultural affiliations....The analysis shall be accurate and extensive enough to allow future researchers information from which to do further studies.

The analysis was severely hampered by the fragmentary nature of the bone. Original removal of the osteological material from the extremely hard and dense soil has severely damaged the bones and has resulted in the destruction of the majority of articular ends. No complete or restorable long bones are present within the collection and many of the fragments are warped due to the effects of ground moisture and pressure.

Radiocarbon dating

Approximately 200 grams of small bone fragments were submitted for a collagen date. The bone sample was comprised primarily of small vertebral fragments which could not be assigned to any particular individual. The date of 5420 ± 210 years before present (Beta 11684) was obtained which would place the burial within the Middle Archaic period or transitional between the Middle and Late Archaic periods as defined by Schmits et al. (1984:13-16).

Analysis

A number of excavated bone fragments as well as several blocks of soil, some of which contained additional osteological material, were shipped to Larson-Tibesar Associates for analysis. The task of removing the soil in order to expose the osteological material was extremely difficult. Attempts were made to X-ray several of these blocks of soil in order to determine the presence and nature of additional osteological materials.

This proved unsuccessful, however, owing to the density and high mineral content of the soil matrix. (See Appendix A for a more detailed description of the soil's characteristics.) The task of removing the soil adhering to the osteological materials was therefore carefully accomplished through the use of dental picks.

After removal of the adhering soil, the various bones of each individual were separated into discrete groups based on criteria of age, sex and robusticity. A total of three individuals are represented in the assemblage.

The three individuals have been designated as 23JA227-1, 23JA227-2 and 23JA227-3 based on the relative completeness of their skeletons; Individual 23JA227-1 being the most complete and so on. The differences in the amounts of skeletal material associated with each individual undoubtedly reflect inadequate recovery techniques as well as the loss of bones due to differential exposure rates and natural erosional forces. A listing of identified elements by individual as well as unassigned skeletal materials are presented in Appendix B. No cut marks, evidence of burning or use of red ocher was observed on any of the osteological remains.

As previously mentioned, all of the cranial and post-cranial remains are highly fragmentary. Where possible, attempts at restoration have been made but the results have been disappointing in that there are no complete long bones present. Therefore, stature could not be calculated for any of the identified individuals.

Restoration of a badly broken cranium was undertaken with somewhat more satisfying results (Figures 1 and 2). Although many parts of the cranium are missing, measurements were made where possible and these (Table 1), as well as several descriptive nonmetric traits (Table 2), are provided. These data were collected using standard anthropometric and anthroposcopic techniques (i.e. Bass 1971). A detailed description of these methods may also be found in Gill (1971). Cranial indices are defined in Bass (1971) and Jantz and Willey (1983). It should be noted that these results are highly tentative due to the fragmentary nature of the cranium and that attempts to use these measurements for comparative purposes should be done with great caution. Most of the subsequent analysis will therefore concern non-metric observable traits of the cranial and post-cranial skeleton.

Determination of Sex:

All traits of the cranium and post-cranium observed on Individual 23JA277-1 are consistent with those of the male sex. The external occipital protuberance of the posterior cranium is quite large and well defined as is the superior nuchal line. The mastoid processes are large and robust and the brow ridge is quite prominent. Furthermore, the superior margin of the left orbit is blunt and rounded with the overall characteristics of the cranium being heavy and robust.

Observation of the post-cranial remains confirms this assessment in that all of the long bone fragments present, while not giving the appearance of great stature, are exceedingly robust in appearance. A

a

b

Figure 1. Left lateral (a) and frontal (b) view of cranium; Individual 23JA277-1.

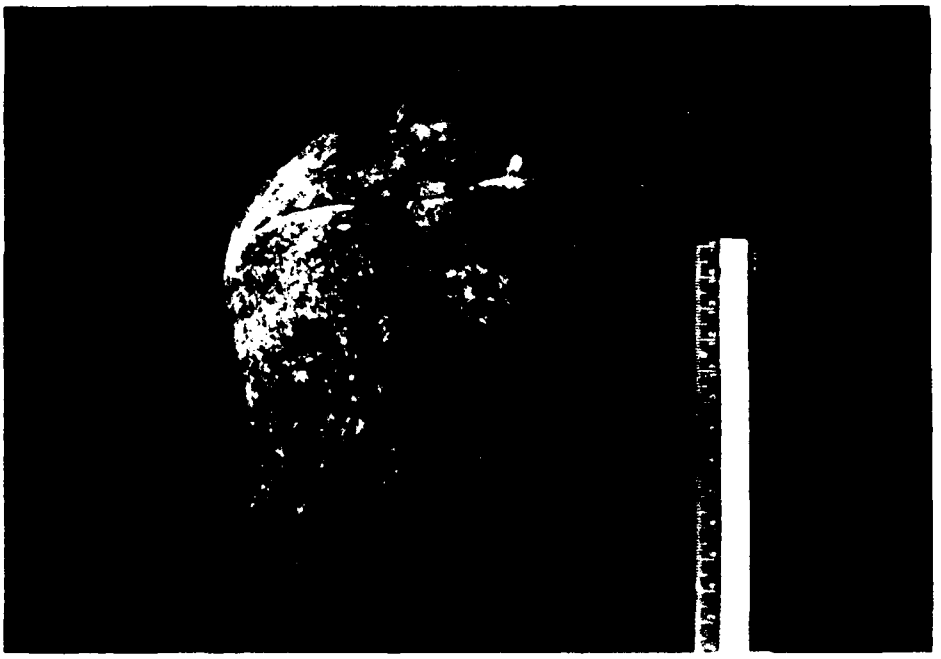

Figure 2. Sagittal view of cranium, Individual 23JA277-1.

Table 1. Cranial measurements and indices computed for Individual 23JA277-1.

MEASUREMENTS

Maximum cranial length	193
Maximum cranial breadth	139
Nasion-occipital length	189
Biasterionic breadth	(116)
Bizygomatic breadth	(132)
Biauricular breadth	(114)
Auricular height	135
Porion-bregma	(135)
-Facial-	
Nasion-alveolar	(74)
Nasal breadth	24
L. orbital height	(33)
L. orbital breadth (dacryon)	43
L. orbital breadth (maxillo-frontale)	45
Biorbital breadth	94
Bifrontal breadth	(92)
Porion-nasion	108
Porion-prosthion	(106)
External alveolar breadth	(71)
Bimaxillary breadth	(96)
Mastoid length	23
Mastoid width	12
Check height	25
Mandibular fossae	24

Indices:

CRANIAL-FACIAL		
Cranial index	72.02	dolichocranic
Auricular mean height index	81.30	

* - Measurements listed in this table are given in millimeters unless otherwise designated.
() - Indicates a closely estimated measurement.

Table 2. Discrete nonmetric cranial traits observed for Individual 23JA277-1.

	OCCURRENCE	
	L	R
Parietal foramen	0	0
Epiteric bone	-	-
Mastoid sutural ossicle	-	-
Parietal notch bones	-	-
Tympanic dehiscence	0	0
Anterior condylar canal	-	-
Supraorbital foramen	-	0
Frontal foramen	-	0
Mylo-hyoid bridge	-	-
Accessory mental foramen	-	-
Epactal ossicle	-	
Inca bone	-	
Palatine torus	-	
Pharangeal fossa	-	
Superior sagittal sinus-right	+	
Metopic suture	0	
Bregmatic bone	-	

(+) - indicates presence of trait
(0) - indicates absence of trait
(-) - indicates that trait cannot be assessed

portion of the left ilium clearly demonstrates a very restricted, narrow greater sciatic notch and a nearly complete left pubic bone shows a noticeable lack of a ventral arch, a relatively broad medial aspect and a narrow sub-pubic angle; all decidedly masculine traits (Bass 1971). Furthermore, a portion of left femoral head measures approximately 48 millimeters in diameter, well within the male range of variability (Stewart 1979).

Due to an apparent paucity of skeletal remains, the sex of individuals 23JA277-2 and 3 is much less certain. A portion of the proximal femoral head attributed to Individual 23JA277-2 has a maximum head diameter of only 40 millimeters which would seem to indicate the female sex (Stewart 1979). However, the observable traits of the long bones appear to be rather undiagnostic. Although Individual 23JA227-2 was obviously rather short in stature, the muscle attachments, especially on the bones of the arms, are fairly distinct and well-developed. Most noticeable of these is the deltoid attachment on the humeral diaphysis. It should be noted, however, that such traits are based on the characteristics of modern-day Caucasian females and are apparently not uncommon for prehistoric American Indian females. The larger, more well-developed muscle attachments present on this individual are perhaps directly related to a life style associated with more physically demanding manual labor. The sex of Individual 23JA277-2 is probably female, although this analysis is by no means absolute.

The scant remains attributed to Individual 23JA277-3 are most likely those of a female as the bones are quite small and gracile and the one remaining fragment of ilium demonstrates a very broad greater sciatic notch, a trait characteristic of the female sex (Bass 1971).

Determination of Age:

In lieu of more diagnostic skeletal material, it is presently believed that all three individuals examined are adults. This analysis is least certain for Individual 23JA277-3 and is based solely on observations from fragments of proximal ulna and proximal radius. The epiphyseal ends of these bones are completely fused to the diaphysis indicating an age for females of at least 15-18 years (McKern and Stewart 1957). The age of this individual is probably somewhat greater, however, in that terminal union appears to have been completed well before death. Unfortunately, with the material at hand, no more accurate assessment can be made.

The age of Individual 23JA277-2 is also based solely on observed rates of epiphyseal union. A portion of proximal femur shows that the epiphyseal head appears to be fully fused to the diaphysis, indicating an age of at least 18 years (McKern and Stewart 1957). Again, the age of this individual is probably somewhat greater in that terminal union was apparently completed at least several years prior to death.

The age of Individual 23JA277-1 may be ascertained with a great deal more accuracy based on several aspects of both the cranial (Figures 1 and 2) and post-cranial skeleton. The remains of a nearly complete maxilla are present as are several teeth which are still embedded in the bony alveolus. These dental remains include the maxillary left canine, both left

premolars, the right canine and the second right premolar. Several associated loose teeth were also recovered including one maxillary molar, one mandibular molar and one broken fragment of molar root. The roots of the molar teeth are exposed due to attrition. This factor alone indicates an age in excess of 55 years (Hrdlicka 1952). Although the calvarium was badly broken, it is apparent that the coronal, sagittal and lambdoidal sutures are completely fused, a phenomenon which is also indicative of old age (Stewart 1979).

Several traits of the post-cranial skeleton also concur with this assessment. A nearly complete portion of left os-pubis indicates an age in excess of 50 years (Todd 1920; McKern and Stewart 1957) in that the surface of the entire demi-face is flat and granulated in appearance, the ventral rampart is complete and the symphysial rim demonstrates areas of disintegration and erratic ossification. Furthermore, osteoarthritic lipping was observed on all the lumbar vertebrae present, the proximal left radius and ulna, and the first right proximal tarsal phalanx. Based on these observations, the age of Individual 23JA277-1 at time of death was most certainly in excess of 55 years and more likely, the individual was in excess of 65 years in age.

Disease and Injury:

Several pathologies were observed on the skeletal remains examined. As previously noted, osteoarthritic lipping is clearly evident on many of the bones associated with Individual 23JA277-1 as are several dental pathologies (see Figure 1). A portion of the left maxilla clearly shows ante-mortem tooth loss of the first molar due to a large abscess. A similar abscess was probably responsible for the anti-mortem loss of the second right maxillary molar. Acute resorption of the alveolus is evident on both portions of maxilla and tartar has built up on all the remaining teeth examined.

A portion of radial diaphysis associated with Individual 23JA277-2 demonstrates the healed remains of a complete bone break which was apparently never correctly re-set as the broken ends overlap somewhat. The bone eventually healed leaving an acute deformity with the overall length of the radius being shortened by as much as two centimeters (Figure 3).

Determination of Race:

All three individuals are undoubtedly of American Indian ancestry as evidenced by the radio-carbon date, apparent burial position and distinctive wear pattern on the teeth associated with Individual 23JA277-1. As previously mentioned, the teeth of Individual 23JA277-1 demonstrate extensive tooth wear as well as severe alveolar resorption and resulting ante-mortem tooth loss; traits characteristic of prehistoric Indian populations. The distinctive wear patterns were probably accentuated by an edge to edge bite, a characteristic quite common among American Indians (Ubelaker 1978).

Figure 3. Healed bone fracture; radius of Individual 23JA277-2.

Burial Position:

Another factor which would tend to confirm the assessment of race is the apparent burial position of all three individuals. While the soil matrix in which these remains were found made the overall analysis of skeletal materials difficult, it also served to cement major components of the skeleton in situ.

The evidence indicates that the individuals were buried in a flexed position. Arms were placed to the individuals' side as evidenced in Figure 4 showing the distal radius adjacent to the lateral side of the femur and ribs adjacent to the medial side of the femur. The position of the metatarsals along the lateral side of the femur (Figure 4) indicates that the individual may have been placed in an upright sitting position with the legs crossed. Although it can not be absolutely stated, the upright sitting position would indicate that the individuals were placed in some type of burial pit.

While the exact cardinal direction cannot be determined, it appears that at least two of the individuals (23JA277-2 and 3) were buried adjacent to one another and facing the same direction. This is evidenced in Figure 5 showing the distal right tibia and fibula of Individual 23JA277-3 adjacent to the left proximal femur and left distal tibia/fibula of Individual 23JA277-2. The right tibia of Individual 23JA277-3 is actually positioned between the tibia and femur of Individual 23JA277-2. It was originally suggested that these long bones represented a single individual. However, this is extremely unlikely due to differences in size and robusticity of the two tibiae (Table 3) as well as the fibulae.

Table 3. Comparisons of tibiae of Individuals 23JA277-2 and 23JA277-3.

	INDIVIDUAL 23JA277-2	INDIVIDUAL 23JA277-3
Mid-shaft anterior-posterior diameter*	3.38	3.00
Mid-shaft medio-lateral diameter*	2.13	1.80

* -- Nutrient foramen is not visible, therefore mid-shaft diameter was used.

Conclusions and Significance

Analysis of osteological remains recovered from site 23JA277 indicates the partial remains of at least three individuals. Individual 23JA277-1 appears to have been a male in excess of 55 or 65 years in age at the time

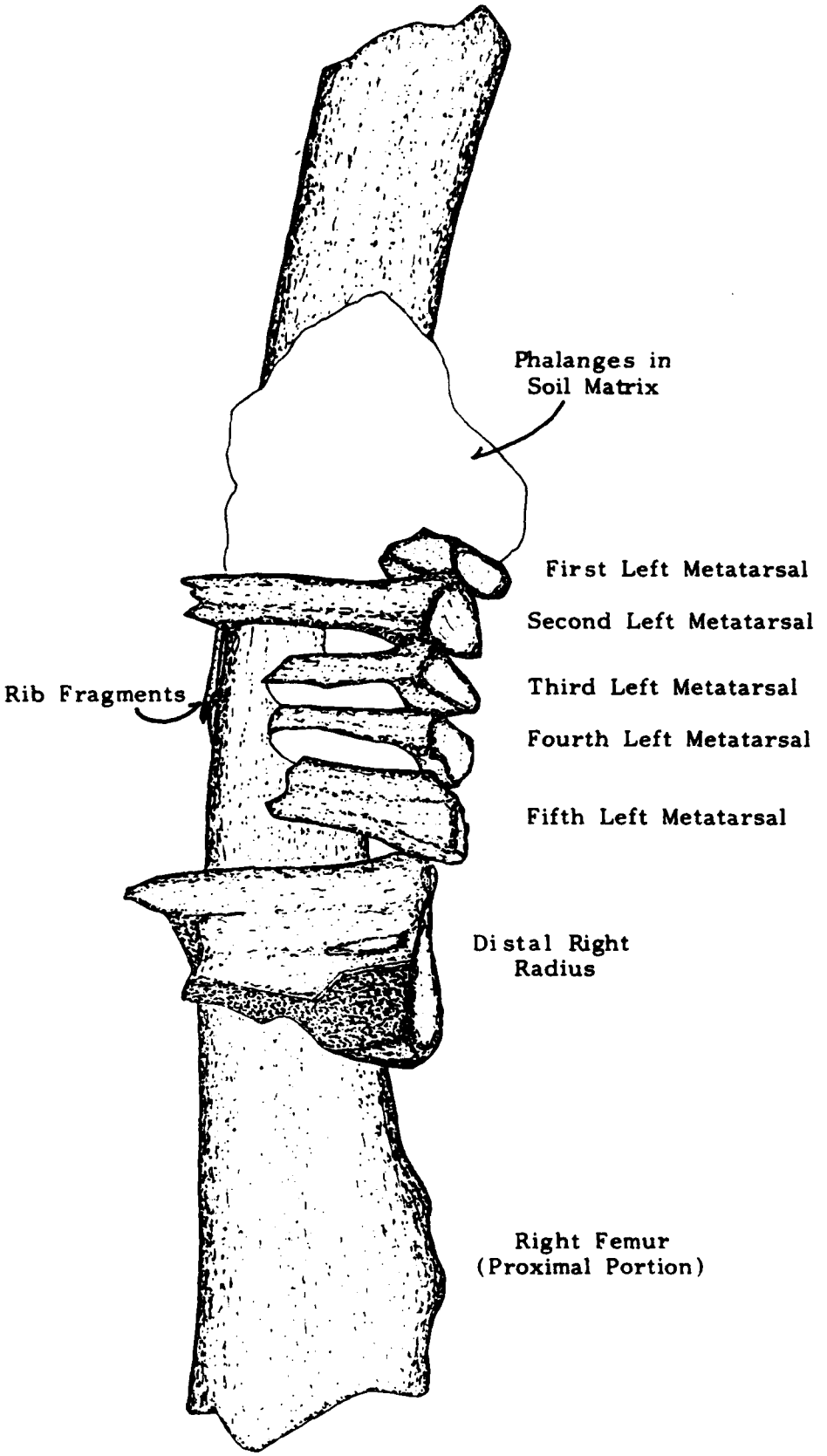

Figure 4. Lateral view showing relationship of ribs, femur, metatarsals and radius; Individual 23JA277-1.

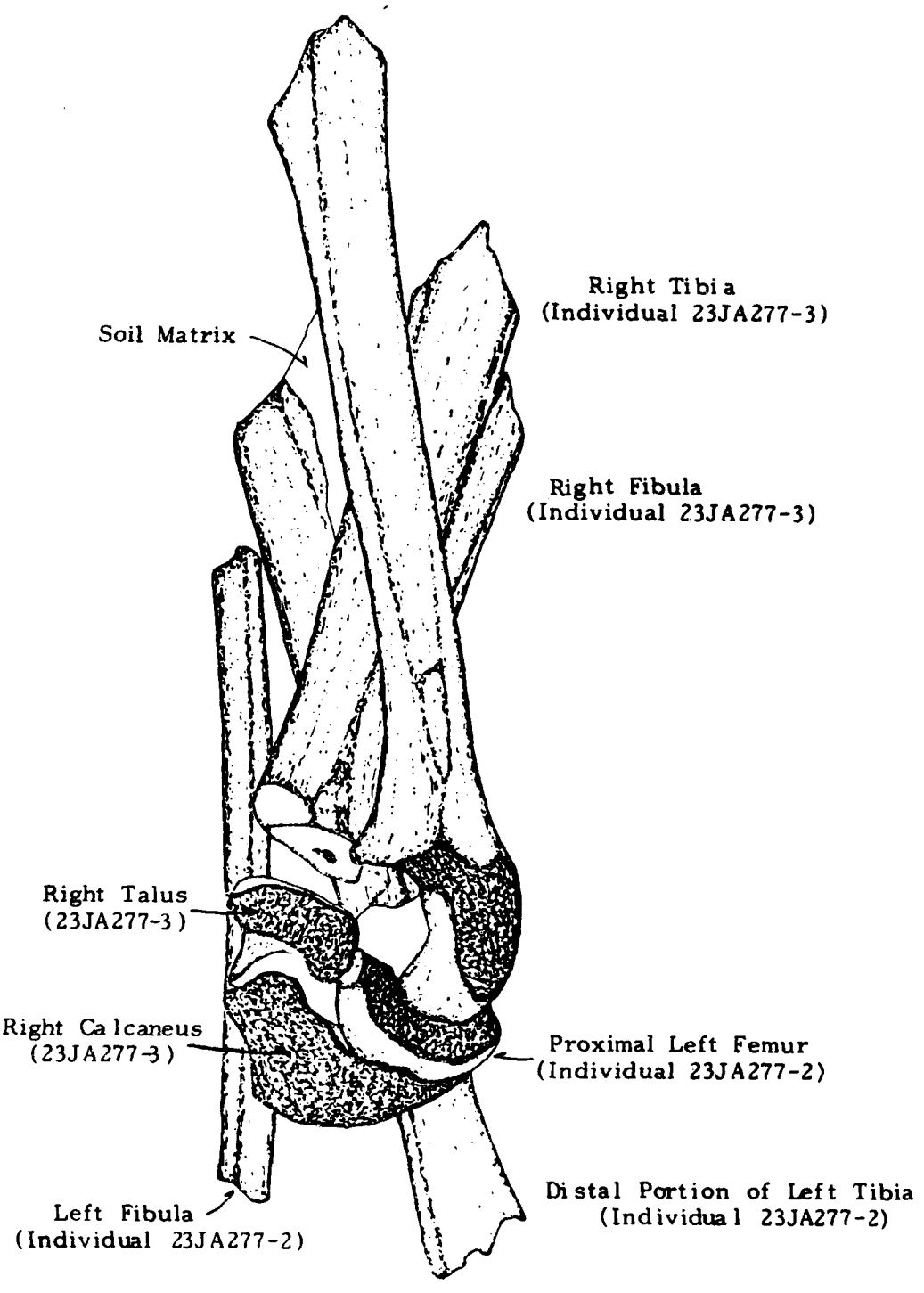

Figure 5. Tibia and fibula of Individual 23JA277-3 in relationship to femur, tibia and fibula of Individual 23JA277-2.

of death. The individual appears to have been fairly robust, however no complete long bones were present to assess stature.

Individuals 23JA277-2 and 3 appear to have been females of quite different stature and robusticity. Both of these individuals were in excess of 18 years of age based on the complete fusion of the few, fragmentary long bones present. A more accurate assessment could not be made due to the paucity of elements present. No cranial elements are associated with either of these individuals.

All of the individuals were undoubtedly of American Indian ancestry as evidenced by the radiocarbon date of 5420 ± 210 years before present (Beta 11684), the advanced degree of tooth wear and the apparent burial position.

Several metric and non-metric observations were attempted on the restored cranium of Individual 23JA277-1 (see Tables 1 and 2). In terms of overall shape, the cranium of Individual 23JA277-1 is large, long and rugged. The angular flat-sided crania form of 23JA277-1 is similar to the Torrington skull (George W. Gill, personal communication 1985) and compares favorably with illustrations of Lansing Man (Bass 1973:100) and Skeleton 1 from the Turin burials (Fisher et al. 1985). In addition, the cranial bones are quite thick (maximum thickness of nine millimeters) and the mandibular fossae are quite deep (24 millimeters).

The auricular mean height index (Jantz and Willey 1983) calculated for Individual 23JA277-1 is 81.30. The high vault form is similar to Lansing Man and Individual I recovered from the Williamson site (14CF330). Lansing Man and the Williamson individual are of comparable antiquity and from the same geographical area as site 23JA277. The auricular mean height index (AMHI) calculated for Lansing Man is 78.05 (Jantz and Willey 1983:61) while an AMHI of 78.8 is reported for the Williamson individual (Bass and Head 1980:180). These values are considerably higher than those calculated for the geographically more northern Turin and Medicine Crow cranium. The AMHI calculated for the Turin and Medicine Crow individuals, which are also of comparable antiquity to 23JA277-1, is 68.29 (Fisher et al. 1985:214) and 68.7 (Bass 1976:699) respectively.

It is possible that the higher vault height exhibited by the more southern specimens (23JA277-1, Lansing Man and the Williamson individual) may be an indication of population differences. Although we are dealing with a very small sample, a higher cranial vault is also exhibited by later populations from the more central and southern portions of the Central Plains area. For example, the individual from 25HN174 (Tibesar et al. 1984), Taylor Mound (Klepinger and Bass 1971) and J. Younkin (Phenice 1969) continue to exhibit a higher cranial vault than contemporaneous specimens from either the Middle Missouri or Northwestern Plains areas (see Tibesar et al. 1984).

The osteological remains recovered from 23JA277 are believed to be significant because of the information which could be obtained through future analysis. Although the present analysis has made a careful attempt to record in as much detail as possible both metric and non-metric observations, the information presently obtained may not reflect new research questions and analytical developments in the field of physical

anthropology. Further analysis of the osteological materials from 23JA277 may be necessary to address such new developments.

The significance of the materials recovered from 23JA277 is also based on the information which they have and can provide concerning current research interests in the Little Blue Valley. One of the major research goals proposed by Schmits et al. (1984:81) is to "characterize the transition from the Middle to Late Archaic in the Little Blue Valley." In light of this research goal, the osteological materials recovered from 23JA277 are significant in that they provide the only known physical anthropological data or information regarding burial practices for the Middle to Late Archaic period in the Little Blue Valley.

Another important research question proposed for the Little Blue Valley concerns the investigation of Archaic settlement-subsistence patterns. The "Reid-Reeder model" hypothesizes the winter usage of the lowlands and valleys and warm weather use of the uplands. However, as stated by Schmits et al. (1984), there is little supporting empirical evidence for this model due to the apparent lack of Middle Archaic period sites within the Little Blue Valley. It is possible that scouring by river meanderings prior to the stabilization of the T-1 terrace may have destroyed a number of these early sites (Schmits et al. 1984:13). Schmits et al. (1984) also suggest that the apparent lack of substantial Middle Archaic occupation in the Little Blue Valley may be due to the fact that these older sites are deeply buried under alluvial deposits and have simply not yet been located.

Site 23JA277 is important because of the evidence it provides regarding the location of older sites within the Little Blue Valley. At site 23JA277, osteological materials associated with the Middle Archaic or transitional between the Middle and Late Archaic periods were found at a depth of approximately four meters. A similar situation occurs at site 23JA143 where a Middle Archaic component is buried approximately 3.5 meters below the surface. It appears that relatively older sites have been preserved within the Valley and that these sites are buried to substantial depths. Future researchers should attempt to use the locational information of sites such as 23JA277 and 23JA143 in attempting to locate additional sites associated with the Middle or Late Archaic periods.

GLOSSARY

Auricular Mean Height Index (AMHI): Ar index developed to measure the height of the human skull through the use of maximum length, maximum breadth, and auricular height.

Central Plains Area: That portion of the Great Plains east to west from the Missouri River to the Rocky Mountains and north to south from the Niobrara River to the Upper Arkansas River Basin.

Head Height: A term used to describe the appearance of the cranial vault of the human skull.

Middle Missouri Area: The cultural and physiographic portion of the Great Plains which includes those portions of the Missouri River Valley from approximately and Montana-North Dakota border to the South Dakota-Nebraska border.

Non-metric Traits: Attributes of a human skull or other part of the body which are not measurable but which are observable and may be indicative of the race, sex or age of the individual.

Northwestern Plains Area: That portion of the Great Plains which includes western North Dakota, western South Dakota, those portions of Alberta and Saskatchewan south of the Saskatchewan River, north-central Colorado and all of Montana and Wyoming.

Osteological Material: Any or all portions of the skeletal system which are non-cartilaginous.

REFERENCES CITED

Bass, William M.
1971 Human osteology: A laboratory and field manual of human skeleton (second edition). Missouri Archaeological Society, Columbia, Missouri.

1973 Lansing Man: A half century later. American Journal of Physical Anthropology 38(1):99-104.

1976 An early Indian cranium from the Medicine Crow site, (39BF2), Buffalo County, South Dakota. American Journal of Physical Anthropology 45(3):695:700.

Bass, William M., and James H. Head
1980 Human skeletal material from a Late Archaic site in Kansas. In: Salvage archeology of the John redmond Lake Kansas, edited by Thomas A. Witty, Jr. Kansas State Historical Society anthropological series No. 8:174-185.

Fisher, Alton K., W.D. Frankforter, Joseph A. Tiffany, Shirley J. Schermer, and Duane C. Anderson
1985 Turin: A Middle Archaic burial site in western Iowa. Plains Anthropologist 30(109):195-218.

Gill, George W.
1971 The prehistoric inhabitants of northern Coastal Nayarit: Skeletal analysis and description of burials. Unpublished Ph.D. dissertation, Department of Anthropology, University of Kansas.

Hrdlicka, Ales
1952 Practical Anthropometry, edited by T.D. Stewart. The Wistar Institute of Anatomy and Biology, Philadelphia.

Jantz, Richard L., and Patrick Willey
1983 Temporal and Geographic patterning of relative head height in the Central Plains and Middle Missouri areas. Plains Anthropologist 28(99):59-69.

Klepinger, Linda, and William M. Bass
1971 Human skeltal material from Taylor mound 14DP3, Doniphan County, Kansas. Plains Anthropologist 16(53):183-189.

McKern, T.W. and T.D. Stewart
1957 Age changes in young American males, Headquarters Quartermaster Research and Development Command, U.S. Army Technical Report Ep-45, Natik, Massachusetts.

Phenice, Terrell W.
1969 An analysis of the human skeletal material from burial mounds in northcentral Kansas. University of Kansas Publications in Anthropology No. 1.

Schmits, Larry J., James D. Donohue and Rolfe Mandel
1984 Interim report on archaeological data recovery and mitigation at sites 23JA143, 23JA155 and 23JA238, Blue Springs Lake Project, Jackson County, Missouri. Report submitted to the U.S. Army Corp of Engineers, Kansas City District.

Stewart, T.D.
1979 Essentials in forensic anthropology. Charles C. Thomas, Springfield, Illinois.

Tibesar, William L., Thomas K. Larson, Scott J. Baker, T.A. Christensen, Keith H. Dueholm and Paul H. Sanders
1984 Archaeological and osteological analyses of two burial sites along Harlan County Lake, Nebraska: Chronological and evolutionary implications. Manuscript prepared for the U.S. Army Corps of Engineers, Kansas City District

Todd, T.W.
1920 Age changes in the pubic bone I: The male white pubic. American Journal of Physical Anthropology, 3:285-334.

Ubelaker, Douglas H.
1978 Human skeletal remains. Aldine, Chicago.

APPENDIX A

DESCRIPTION OF SOIL CHARACTERISTICS

By:

Ross G. Hilman

The silty clay soil matrix surrounding the human remains has a hard, massive structure riddled with many small channels. Color is strong brown (7.5YR 5/6 dry) to dark brown (7.5YR 3/4 moist). Both dark and light mottles are present. Lighter mottles are reddish yellow (7.5YR 6/8 moist) and dark brown (7.5YR 3/4 dry). Darker mottles are dark grayish brown (10YR 4/2 dry) and very dark grayish brown (10YR 3/2 moist). The dark stain coating much of the bone is very dark gray (7.5YR 3/0 dry).

The dark mottles are carbonized organic matter, some of which retain a wood-like structure. Dark mottles and the stain coating the bones effervesces with a three percent hydrogen peroxide solution, indicating the presence of manganese. Manganese appears to be impregnating, and perhaps replacing, some of the carbonized organic matter. The reddish colors in the soil matrix are probably due to iron oxides. The reddish color of the soil matrix and the many channels indicates a soil that is seasonably wet but is dry for enough of the year that chemical reactions are dominated by oxidation rather than reduction.

APPENDIX B

LISTING OF IDENTIFIED ELEMENTS, BY INDIVIDUAL

By:

Scott J. Baker

INDIVIDUAL 23JA277-1

Cranial Remains

portion of left temporal
portion of right temporal
portion of medial and left frontal bone with superior margin of left orbit, fragments of both nasal bones and a portion of left lacrimal
nearly complete but fragmentary occipital bone
nearly complete but fragmentary portions of both parietal bones
fragment of right mandibular condyle
nearly complete portion of left malar and maxilla with left canine tooth and both pre-molars
nearly complete right malar and maxilla with right canine and second pre-molar

Associated Teeth

mandibular molar
maxillary molar
fragment of molar root

Post-cranial Remains

fragment of proximal humerus
nearly complete but badly broken left humeral diaphysis
fragment of distal right humerus
fragment of proximal right humeral diaphysis
two fragments of proximal right radius and ulna
two fragments of distal right radius and ulna
fragment of proximal left radius
two fragments of right radius
nearly complete right femoral diaphysis
fragment of proximal right femur (femoral head with greater trochanter)
fragment of left femoral head
two fragments of distal femoral condyle
fragment of distal tibia
fragment of fibula diaphysis
fragment of distal left fibula
fragment of thoracic vertebra
five nearly complete lumbar vertebra
portion of left innominate (ilium and ischium)
nearly complete left pubis
fragment of right scapula (glenoid and portion of acromion)
eight rib fragments
all five metatarsals from left foot
three tarsal phalanges
two proximal carpal phalanges
right lunate
right greater multangular

INDIVIDUAL 23JA277-2

Cranial Remains and Associated Teeth

none present

Post-cranial Remains

two fragments of proximal humerus
fragment of distal left radius
nearly complete but broken left ulna diaphysis
two fragments of left radius
two fragments of right radius
nearly complete left femur with fragments of articulating innominate surrounding the acetabulum
nearly complete left tibial diaphysis
portion of left fibula
portions of both humeral diaphysis
fragment of proximal right femur
fragment of distal femoral condyle
fragment of right scapula
fragment of left scapula
four rib fragments

INDIVIDUAL 23JA277-3

Cranial Remains and Associated Teeth

none present

Post-cranial Remains

nearly complete left humeral diaphysis
nearly complete but broken left ulna
fragment of proximal left ulna
fragment of distal radial diaphysis
fragment of left tibial diaphysis
distal portion of right tibia
distal portion of fibula
fragment of unsided fibula diaphysis
fragment of right clavicle
nearly complete left clavicle
five nearly complete cervical vertebra (#2-7)
fragment of left innominate
two fragments of metacarpal
proximal carpal phalange
right talus
right calcaneus

UNASSIGNED BONE FRAGMENTS

Cranial Remains and Associated Teeth

none present

Post-cranial Remains

fragment of distal humerus
fragment of proximal humerus
fragment of ulna diaphysis
fragment of femoral diaphysis
fragment of proximal femur with greater and lesser trochanters
five fragments of tibial diaphysis
fragment of proximal fibula
two fragments of scapula
three fragments of innominate (Ilium)
fragment of sacrum
24 rib fragments
seven metacarpal fragments
fragments of three metatarsals
fragments of three proximal carpal phalanges
fragments of three medial carpal phalanges
one distal carpal phalanx (first)
one distal tarsal phalanx (first)
fragment of calcaneus
fragment of cervical vertebra
eight fragments of thoracic vertebra
five fragments of lumbar vertebra